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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R14-0012F
Plant ID No.:	003-00042
Applicant:	Quad/Graphics, Inc. (Q/G)
Facility Name:	Martinsburg Plant
Location:	Berkeley County
SIC Code:	2754, 2752, 2893
Application Type:	Modification
Received Date:	September 18, 2014
Engineer Assigned:	Joe Kessler
Fee Amount:	$3,500
Date Received:	September 22, 2014 ($1,000) October 21, 2014 ($2,500)
Complete Date:	November 3, 2014
Due Date:	February 1, 2015
Applicant Ad Date:	September 23, 2014
Newspaper:	*The Journal*
UTM's:	Easting: 247.0 km Northing: 4,377.0 km Zone: 17
Latitude/Longitude:	39.50926/-77.95182
Description:	Modification to increase the allowable VOC emissions of the Rennzman Cylinder Washing Unit.

The Q/G Martinsburg Plant has undergone several modifications and has been the subject of various permitting actions since construction. To place the current application in context, the following will summarize each permitting action to provide a background for this permitting action. They are presented in a generally chronological order.

R14-0012

On September 14, 1995, the Prevention of Significant Deterioration (PSD) Permit Number R14-0012 was issued to Q/G for the construction of a new printing and publishing facility in Martinsburg, WV. Included in the permit were twelve (12) publication rotogravure (R/G) presses, one (1) proof press, two (2) chrome plating operations, two (2) boilers, and ten (10) ink storage tanks. The only pollutant that underwent PSD review during this permitting action was Volatile Organic Compounds (VOCs). Other pollutants were emitted, or limited to, less than significant thresholds.

R13-2189

On April 16, 1999, Permit Number R13-2189 was issued for the installation of three (3) heatset web offset lithographic (O/S) presses at the Martinsburg Plant. It was issued as a synthetic minor and limited VOC emissions to less than 39.4 TPY. No pollutants were in excess of the significance thresholds in 45CSR14 and the action did not undergo PSD review.

R13-2189A

On September 1, 1999, Permit Number R13-2189A was issued as an Administrative Update (A/U) to R13-2189. The update was instigated by permit determination PD99-162 and resulted from a change in Fountain Solutions within the O/S presses. VOC emissions slightly decreased as a result of this A/U.

R13-2160

On February 28, 2000, Permit Number R13-2360 was issued to Q/G for the installation of an ink blending operation at the Martinsburg Plant. This operation contained eleven (11) permanent storage tanks, seven (7) permanent mixing tanks, and three (3) portable totes. The tanks range in volume from 5,000 to 30,000 gallons (nominal capacity) and the totes range in volume from 350 to 554 gallons (nominal capacity). Q/G uses the facility to blend inks for use in their R/G printing lines. No pollutants were in excess of the significance thresholds in 45CSR14 and the action did not undergo PSD review.

R14-0012A

On December 5, 2000, permit R14-0012A was issued to Q/G to address the reorganization of the boiler operating parameters. The permit was an administrative update to the original PSD permit R14-0012, and reorganized the limits on the two boilers permitted under R14-0012 and the back-up boiler constructed under Consent Corder CO-R13-C-2000-18(A) to allow for the operation of all three simultaneously but with no increase in annual Oxides of Nitrogen (NO_x) or VOC emissions.

R14-0012B

Permit R14-0012B was issued as a major modification (subject to PSD review) on August 30, 2001 and consisted of the addition of six (6) publication rotogravure presses, nine (9) heatset lithographic web offset presses, one (1) chrome plating operation, three (3) natural gas fired boilers, and five (5) storage tanks. The permit also consolidated all of the above permits (including R13-2189A and R13-2160) into one permit. The pollutants NO_x and VOC underwent PSD review as part of this permitting action.

R14-0012C

Permit R14-0012C was issued on April 7, 2008 and authorized installation of an ink manufacturing plant at the facility and associated loadout emissions. The permit was issued as a minor modification to a major source.

R14-0012D

Permit R14-0012D was issued on December 22, 2010 and authorized an increase in the permitted throughput of the existing storage tanks T-11 through T-15 (using them now for ink manufacturing instead of rotogravure ink storage) and R2, and an increase in the throughput of manufactured ink loadout operations. No new equipment was proposed for this modification. As noted above, the ink manufacturing operations were added under R14-0012C issued in 2008.

R14-0012E

On February 15, 2011,, a Class II A/U (R14-0012E) was issued to Q/G to replaced a fire-destroyed rotogravure press (G-20) with a new rotogravure press (G-28). A PSD Netting Analysis was included in permit application.

DESCRIPTION OF PROCESS/MODIFICATIONS

Existing Facility Description

Q/G operates a printing and publishing facility in Martinsburg, WV. The facility is located in the Cumbo Yard Industrial Park adjacent to I-81 and is north of downtown Martinsburg. The plant prints catalogs, magazines, and inserts for periodicals. It utilizes web-fed publication rotogravure printing and heatset web offset lithographic printing presses to achieve this end. Also present at the plant are an ink blending and manufacturing facility, ink storage tanks, natural-gas boilers, chrome plating operations, a solvent recovery system, label making ink-jet printers, and a cylinder washer that are supportive parts of the Martinsburg Plant.

Detailed Cylinder Washing Unit Description

Q/G operates a Daetwyler Rennzmann Rotogravure Cylinder Washing Machine (Type 136S-50) at the Martinsburg Facility. It has a maximum capacity to wash two (2) cylinders per cycle and is capable of performing a maximum of 1.80 cycles per hour. The cylinders are washed free of excess rotogravure inks and extenders.

The system contains one 400 gallon clean tank, one 400 gallon dirty tank ,and a Roto Zero x 650 Distillation Unit with a filling capacity of 171 gallons. The capacity of the washing machine itself is 1,788 gallons. Initially, the washing machine is charged with 400 gallons of cleaning solution and the clean solvent tank is replenished with 400 gallons of cleaning solution.

Filling the washing machine is a manual procedure. The operator opens a valve marked "Fill," then pushes the "Fill" start button on the machine. The machine stops filling when the minimum operating level is reached. The washing machine starts to fill-up to a point of about 300 or 400 gallons before it hits the high limit switch. The operator then closes the "Fill" valve and the machine is ready for automatic operation. The washing machine cannot overflow because the clean tank only holds 400 gallons.

The lid opens, the ventilation fan speeds up to 3,530 cfm, and an overhead crane loads two cylinders into the washing machine compartment. A minimum level float in the washing machine assures that the solvent capacity is at the appropriate level, otherwise the machine will not start. The lid automatically closes and a wash cycle occurs for approximately 20 minutes. When the lid is closed, the ventilation fan reduces to 1,760 cfm to draw any vapors from around the lid seal. Vapors are vented from around the tank casement during the wash cycle, not internally.

Immediately following the wash cycle an approximate 2 minute rinse cycle and a 4 minute drying cycle will take place. This consists of high-pressure spray-bars rinsing the cylinders. At the end of the drying cycle, the tank is internally vented for about 1 minute. The total Rennzman Unit is vented to the atmosphere (S-82). The time cycles for each washing segment are monitored by a programmable logic controller (PLC), and are adjustable.

When the entire cycle is finished, tank empties and is controlled by a minimum level float switch to 3,530 cfm. The overhead crane extracts the two cylinders and places them on a storage rack, or they are taken to the Chrome/Dechrome Plating Room.

The solvent that is added to the washing machine from the rinse cycle will continue to build up, and when the machine reaches the maximum level, it will do a self clean cycle and transfer the dirty solvent solution to the dirty holding tank. At this point, dirty solvent is transferred from the dirty holding tank to the distillation unit and the distillation process is started. The distillation process will reclaim the cleaning solution and return it to the clean holding tank to be reused in the washer. The ink solids removed from the cleaning solution will be disposed of as waste.

Proposed Modifications

Based on use of a higher VOC-containing washing solution, QG is proposing an increase in the VOC emissions of the cylinder washing unit.

SITE INSPECTION

Due to the nature of the proposed modification, the author did not perform a site inspection of the facility for this permitting action. The facility was last inspected by DAQ Compliance/ Enforcement (C/E) Inspector Joseph Kreger of the Eastern Panhandle Regional Office on July 2, 2014. This inspection found the facility be "Status 30 - In Compliance."

AIR EMISSIONS AND CALCULATION METHODOLOGIES

The following will only detail the calculation methodologies of the unit modified as part of this permitting action: the cylinder washing unit.

The potential emissions from the RENZMANN cylinder washer are based on a mass balance equation - all VOCs within the lost cleaning solvent are estimated to be emitted. Maximum hourly and annual emissions were based on the following information:

- 4.34 lbs solvent used/cylinder washed;

- 3.60 cylinders cleaned/hour;
- 3,228 hours of operation/rolling 12-month period; and
- A 98% VOC concentration in the new cleaning solution.

Based on this mass balance equation, the proposed new VOC emissions from the cylinder washer is calculated to be 15.34 lbs/hour and 24.76 tons/year. This represents a VOC increase of 11.37 lbs/hour and 13.59 tons/year from use of the unit.

REGULATORY APPLICABILITY

The following will discuss each rule or applicable or potentially applicable to the cylinder washing unit.

45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed change to the cylinder washing unit has the potential to increase the PTE of the Martinsburg Plant in excess of six (6) lbs/hour and ten (10) TPY of VOCs and, therefore, pursuant to §45-13-2.17, the change is defined as a "modification " under 45CSR13. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction, modification, relocation and operation of any stationary source to be commenced without . . . obtaining a permit to construct." Therefore, Q/G is required to obtain a permit under 45CSR13 for the modification of the facility.

As required under §45-13-8.3 ("Notice Level A"), Q/G placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The ad ran on September 23, 2014 in *The Journal* and the affidavit of publication for this legal advertisement was submitted on October 1, 2014.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

The Q/G Martinsburg Plant is defined, pursuant to §45-14-2.43(a), as a "major stationary source." Therefore, pursuant to §45-14-2.40, any " physical change in or change in the method of operation" at the facility that would result in a "significant" net emissions increase at the facility would be defined as a "major modification" and trigger PSD review. The use of a higher VOC containing cleaning solution in the cylinder washing unit is defined as a "change in the method of operation" and, therefore, requires a review of potential PSD applicability.

Pursuant to Section 3 of 45CSR14, the first step in PSD applicability determination process when proposing a modification is to examine the potential, or projected actual, emissions associated with the change itself. In this modification, the only change is the change in the method of operation

of the cylinder washing unit. As the post-modification PTE associated with the unit is less than 40 TPY of VOCs (the "significance" level of VOCs), the modification is not defined as a "major modification" and is not subject to PSD review.

45CSR30: Requirements for Operating Permits

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The Martinsburg Plant, defined under Title V as a "major source," was last issued a Title V permit on April 12, 2012. Proposed changes evaluated herein must also be incorporated into the facility's Title V operating permit. Commencement of the operations authorized by this permit shall be determined by the appropriate timing limitations associated with Title V permit revisions per 45CSR30.

40 CFR 63, Subpart KK: National Emission Standards for the Printing and Publishing Industry

The printing and publishing MACT standards, published on May 30, 1996, and amended on May 24, 2006, impose control requirements on publication and product/packaging rotogravure presses and web-wide flexographic presses. The Subpart KK standards provide major HAP sources with a number of compliance options. Specifically, sources may limit their HAP emissions by: 1) employing traditional control devices such as incinerators, 2) installing HAP recovery devices such as condensers or carbon absorbers, 3) reducing the HAP content of products they use by replacing the HAPs with less hazardous materials, or 4) employing combinations of control and recovery devices and/or material substitution.

Q/G currently shows compliance with the Subpart KK 92% destruction/recovery HAP requirement (§63.824) by utilizing a carbon adsorption solvent recovery system. This system, with a inlet/outlet capture efficiency of 98.25%, combined with the 100% capture of the press room enclosures, gives an overall annual control efficiency of the rotogravure presses of 96.00% (solvent retention in the printed materials makes up the difference in overall control percentage).

The cylinder washing unit is also subject to the provisions of 63.824 but is not vented to the SRS. It will meet the requirement by limiting the HAP contents of the materials used to less than 8% of the total volatile matter of the material, by weight. Q/G has estimated that no HAPs will be emitted in the cylinder washing unit.

TOXICITY ANALYSIS OF NON-CRITERIA REGULATED POLLUTANTS

The requested change evaluated herein will not result in any increase in any non-criteria regulated pollutants.

AIR QUALITY IMPACT ANALYSIS

The proposed modification does not meet the definition of a "major modification" pursuant to 45CSR14 and, therefore, an air quality impact (computer modeling) analysis was not required. Additionally, based on the nature of the proposed modification, modeling was not required under 45CSR13, Section 7.

MONITORING, COMPLIANCE DEMONSTRATIONS, RECORD-KEEPING, AND REPORTING REQUIREMENTS

No changes are being made in the monitoring, compliance demonstrations, record-keeping, and reporting requirements of the permit. The monitoring and compliance demonstration related to cylinder washing unit will remain on an "actual emissions reporting basis" as given under 4.2.8 of the draft permit.

TESTING OF OPERATIONS

No additional testing requirements were added as a part of this modification. Compliance with the emission limits is based on material balance equations and accepted web retention and evaporation factors.

CHANGES TO PERMIT R14-0012E

The substantive made changes to R14-0012E were limited to:

- Revision of the Cylinder Washing Unit emission limits under Attachment A of the permit.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of Permit Number R14-0012E to Quad/Graphics, Inc. for the above discussed changes to the Martinsburg Plant located in Martinsburg, Berkeley County, WV.

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Joe Kessler, PE
Engineer

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Date